

AMENDMENTS TO THE CLAIMS

- 1 1. (Currently Amended) A method for marking one or more packets of data in a
2 packet-switched network based on achieved flow bandwidth information within
3 the network, comprising the computer-implemented steps of:
4 receiving a first group of one or more packets of a data flow from the network;
5 marking ~~[[a]]~~the first group of one or more packets of ~~[[a]]~~said data flow with a
6 first behavioral treatment value, wherein the first behavioral treatment
7 value directs devices within the network to treat the first group of one or
8 more packets with a first quality of service treatment;
9 transmitting the first group of one or more packets of said data flow in the
10 network;
11 determining an achieved flow bandwidth for the data flow based on data traffic
12 within the network;
13 determining a second behavioral treatment value based on the achieved flow
14 bandwidth for the data flow within the network; ~~and~~
15 receiving a second group of one or more packets of said data flow from the
16 network;
17 marking ~~[[a]]~~the second group of one or more packets of said data flow with said
18 second behavioral treatment value, wherein the second behavioral
19 treatment value directs devices within the network to treat the second
20 group of one or more packets with a second quality of service treatment;
21 and

22 transmitting the second group of one or more packets of said data flow in the
23 network.

1 2. (Original) The method as recited in Claim 1, wherein:
2 the step of marking a first group of one or more packets includes the step of
3 storing a first differentiated services codepoint (DSCP) value in each
4 header of the first group of one or more packets of a data flow;
5 the step of determining a second behavioral treatment value includes the step of
6 determining a second DSCP value; and
7 the step of marking a second group of one or more packets includes the step of
8 storing the second DSCP value in each header of the second group of one
9 or more packets of a data flow.

1 3. (Original) The method as recited in Claim 1, further comprising the steps of:
2 determining packet flow characteristics of the first group of one or more packets
3 of a data flow; and
4 determining the second behavioral treatment value based on the available
5 bandwidth within the network and the packet flow characteristics of the
6 first group of one or more packets of a data flow.

1 4. (Original) The method as recited in Claim 1, further comprising the steps of:
2 establishing a Quality of Service (QoS) policy for applying a per-hop-behavior
3 treatment for forwarding packets within a flow in said network; and
4 generating the first behavioral treatment value based on the established QoS
5 policy.

1 5. (Currently Amended) A computer-readable medium carrying one or more
2 sequences of instructions for marking one or more packets of data in a packet-
3 switched network based on achieved flow bandwidth information within the
4 network, wherein execution of the one or more sequences of instructions by one or
5 more processors causes the one or more processors to perform the steps of:
6 receiving a first group of one or more packets of a data flow from the network;
7 marking [[a]]the first group of one or more packets of [[a]]said data flow with a
8 first behavioral treatment value, wherein the first behavioral treatment
9 value directs devices within the network to treat the first group of one or
10 more packets with a first quality of service treatment;
11 transmitting the first group of one or more packets of said data flow in the
12 network;
13 determining an achieved flow bandwidth for the data flow based on data traffic
14 within the network;
15 determining a second behavioral treatment value based on the achieved flow
16 bandwidth for the data flow within the network; ~~and~~
17 receiving a second group of one or more packets of said data flow from the
18 network;
19 marking [[a]]the second group of one or more packets of said data flow with said
20 second behavioral treatment value, wherein the second behavioral
21 treatment value directs devices within the network to treat the second
22 group of one or more packets with a second quality of service treatment;
23 and

24 transmitting the second group of one or more packets of said data flow in the
25 network.

1 6. (Original) The computer-readable medium as recited in Claim 5, wherein:
2 the step of marking a first group of one or more packets includes the step of
3 storing a first differentiated services codepoint (DSCP) value in each
4 header of the first group of one or more packets of a data flow;
5 the step of determining a second behavioral treatment value includes the step of
6 determining a second DSCP value; and
7 the step of marking a second group of one or more packets includes the step of
8 storing the second DSCP value in each header of the second group of one
9 or more packets of a data flow.

1 7. (Original) The computer-readable medium as recited in Claim 5, further
2 comprising instructions for performing the steps of:
3 determining packet flow characteristics of the first group of one or more packets
4 of a data flow; and
5 determining the second behavioral treatment value based on the available
6 bandwidth within the network and the packet flow characteristics of the
7 first group of one or more packets of a data flow.

1 8. (Original) The computer-readable medium as recited in Claim 5, further
2 comprising instructions for performing the steps of:
3 establishing a Quality of Service (QoS) policy for applying a per-hop-behavior
4 treatment for forwarding packets within a flow in said network; and

generating the first behavioral treatment value based on the established QoS
policy.

9. (Currently Amended) A computer apparatus comprising:

a processor; and

a memory coupled to the processor, the memory containing one or more

sequences of instructions for marking one or more packets of data in a

packet-switched network based on achieved flow bandwidth information

within the network, wherein execution of the one or more sequences of

instructions by the processor causes the processor to perform the steps of:

receiving a first group of one or more packets of a data flow from the

network;

marking ~~[[a]]~~the first group of one or more packets of ~~[[a]]~~said data flow

with a first behavioral treatment value, wherein the first behavioral

treatment value directs devices within the network to treat the first

group of one or more packets with a first quality of service treatment;

transmitting the first group of one or more packets of said data flow in the

network;

determining an achieved flow bandwidth for the data flow based on data

traffic within the network;

determining a second behavioral treatment value based on the achieved

flow bandwidth for the data flow within the network; ~~and~~

receiving a second group of one or more packets of said data flow from the

network;

22 marking ~~[[a]]~~the second group of one or more packets of said data flow
23 with said second behavioral treatment value, wherein the second
24 behavioral treatment value directs devices within the network to treat
25 the second group of one or more packets with a second quality of
26 service treatment; and
27 transmitting the second group of one or more packets of said data flow in
28 the network.

1 10. (Original) The computer apparatus as recited in Claim 9, wherein:
2 the step of marking a first group of one or more packets includes the step of
3 storing a first differentiated services codepoint (DSCP) value in each
4 header of the first group of one or more packets of a data flow;
5 the step of determining a second behavioral treatment value includes the step of
6 determining a second DSCP value; and
7 the step of marking a second group of one or more packets includes the step of
8 storing the second DSCP value in each header of the second group of one
9 or more packets of a data flow.

1 11. (Original) The computer apparatus as recited in Claim 9, further comprising
2 instructions for performing the steps of:
3 determining packet flow characteristics of the first group of one or more packets
4 of a data flow; and

determining the second behavioral treatment value based on the available
bandwidth within the network and the packet flow characteristics of the
first group of one or more packets of a data flow.

12. (Original) The computer apparatus as recited in Claim 9, further comprising
instructions for performing the steps of:
establishing a Quality of Service (QoS) policy for applying a per-hop-behavior
treatment for forwarding packets within a flow in said network; and
generating the first behavioral treatment value based on the established QoS
policy.

13. (Currently Amended) A network device configured for marking one or more
packets of data in a packet-switched network based on achieved flow bandwidth
information within the network, comprising:
means for receiving a first group of one or more packets of a data flow from the
network;
means for marking ~~[[a]]the~~ first group of one or more packets of ~~[[a]]said~~ data
flow with a first behavioral treatment value, wherein the first behavioral
treatment value directs devices within the network to treat the first group
of one or more packets with a first quality of service treatment;
means for transmitting the first group of one or more packets of said data flow in
the network;
means for determining an achieved flow bandwidth for the data flow based on
data traffic within the network;

14 means for determining a second behavioral treatment value based on the achieved
15 flow bandwidth for the data flow within the network; ~~and~~
16 means for receiving a second group of one or more packets of said data flow from
17 the network;
18 means for marking ~~[[a]]~~the second group of one or more packets of said data flow
19 with said second behavioral treatment value, wherein the second
20 behavioral treatment value directs devices within the network to treat the
21 second group of one or more packets with a second quality of service
22 treatment; and
23 means for transmitting the second group of one or more packets of said data flow
24 in the network.

1 14. (Currently Amended) A method for marking one or more packets of data in a
2 packet-switched network based on achieved flow bandwidth information
3 within the network, comprising the computer-implemented steps of:
4 causing one or more network devices to receive a first group of one or more
5 packets of a data flow from the network;
6 causing the one or more network devices to mark ~~[[a]]~~the first group of one or
7 more packets of ~~[[a]]~~said data flow with a first behavioral treatment
8 value, wherein the first behavioral treatment value directs devices
9 within the network to treat the first group of one or more packets with
10 a first quality of service treatment;
11 causing the one or more network devices to transmit the first group of one or
12 more packets of said data flow in the network;

13 determining an achieved flow bandwidth for the data flow based on data
14 traffic within the network;
15 determining a second behavioral treatment value based on the achieved flow
16 bandwidth for the data flow within the network; ~~and~~
17 causing the one or more network devices to receive a second group of one or
18 more packets of said data flow from the network;
19 causing the one or more network devices to mark ~~[[a]]the~~ second group of one
20 or more packets of said data flow with said second behavioral
21 treatment value, wherein the second behavioral treatment value directs
22 devices within the network to treat the second group of one or more
23 packets with a second quality of service treatment; and
24 causing the one or more network devices to transmit the second group of one
25 or more packets of said data flow in the network.

1 15. (Previously Presented) The method as in claim 1, wherein the first behavioral
2 treatment is determined without regard to the achieved flow bandwidth.

1 16. (Previously Presented) The method as in claim 1, wherein the second behavioral
2 treatment is a behavioral treatment that provides a lower level of service than
3 other available choices of behavioral treatments; and
4 wherein the second behavioral treatment provides a high enough level of service
5 to accommodate the achieved flow bandwidth.

1 17. (Previously Presented) The method as in claim 1, wherein the second behavioral
2 treatment is a behavioral treatment that provides a minimum level of service that
3 is a sufficient level of service to accommodate the achieved flow bandwidth.

1 18. (Previously Presented) The method as in claim 1, wherein the step of marking the
2 first group is performed by at least communicating the first behavioral treatment
3 to a differentiated services node located at a border of a differentiated services
4 domain; and
5 wherein the step of marking the second group is performed by at least
6 communicating the second behavioral treatment to the differentiated
7 services node.

1 19. (Previously Presented) A method as in claim 1, further comprising repeating the
2 step of determining the achieved flow bandwidth and steps that follow the step of
3 determining the achieved flow bandwidth.

1 20. (Previously Presented) A method as in claim 1, further comprising repeating the
2 step of determining the achieved flow bandwidth and steps that follow the step of
3 determining the achieved flow bandwidth multiple times, therein enhancing
4 efficiency of the network on an on going basis.

1 21. (Previously Presented) The method as in claim 1, wherein the step of determining
2 the achieved flow bandwidth is performed by at least estimating the achieved flow
3 bandwidth based on Management Information Base (MIB) variables.

1 22. (Previously Presented) The method as in claim 1, wherein the step of determining
2 the achieved flow bandwidth is performed by at least checking a Transfer Control
3 Protocol/ Internet Protocol (TCP/IP) window size and determining a value for the
4 achieved flow bandwidth based on the TCP/IP window size.

1 23. (Previously Presented) The method as in claim 1, wherein the step of determining
2 the achieved flow bandwidth is based on reception quality feedback from a Real-
3 Time Transport Protocol (RTP) receiver.

1 24. (Currently Amended) A method for marking one or more packets of data in a
2 packet-switched network based on achieved flow bandwidth information within
3 the network, comprising the computer-implemented steps of:
4 receiving a first group of packets of a plurality of data flows from the network;
5 marking [[a]]the first group of packets of [[a]]said plurality of data flows with an
6 initial set of behavioral treatment values, wherein the first set of behavioral
7 treatment values direct devices within the network to treat the first group
8 of packets with an initial set of quality of service treatments;
9 transmitting the first group of packets of said plurality of data flows in the
10 network;
11 determining achieved flow bandwidths, wherein an achieved flow bandwidth is
12 determined for each of the plurality of data flows based on data traffic
13 within the network;
14 determining an updated set of behavioral treatment values based on the achieved
15 flow bandwidths within the network; ~~and~~

16 receiving a second group of packets of said plurality of data flows from the
17 network;
18 after the steps of marking the first group and determining the updated set of
19 behavioral treatment values, marking ~~[[a]]~~the second group packets of said
20 plurality of data flows with said updated set of behavioral treatment
21 values, wherein the updated set of behavioral treatment values direct
22 devices within the network to treat the second group of packets with an
23 updated set of quality of service treatments; and
24 transmitting the second group of packets of said plurality of data flows in the
25 network.

- 1 25. (Previously Presented) A method for performing packet marking comprising the
2 computer-implemented steps of:
3 defining an initial set of Quality of Service (QoS) values for coloring packets
4 within a plurality of data flows, wherein each of the QoS values indicates
5 an allocation of bandwidth;
6 coloring a first group of one or more packets of a given data flow selected from
7 the plurality of data flows, without regard to an achieved flow bandwidth,
8 by at least
9 communicating the initial set of QoS values to each of one or more edge
10 differentiated services domain nodes that are located at one or
11 more edges of a differentiated services domain, and
12 the one or more edge differentiated services domain nodes using one or
13 more of the initial set of QoS values to color the first group;

14 estimating traffic bandwidth within the network based on bandwidth information
 15 corresponding to a current traffic pattern of the network, wherein the
 16 traffic bandwidth estimated includes an achieved flow bandwidth for the
 17 given data flow;
 18 determining an updated set of QoS values for coloring packets within the plurality
 19 of data flows, based on the traffic bandwidth estimated,
 20 wherein the updated set of QoS values provide lower levels of service than
 21 other available choices of QoS values, and
 22 wherein the updated set of QoS values provide a high enough level of
 23 service to accommodate the traffic bandwidth estimated;
 24 coloring a subsequent group of one or more packets of the given data flow with
 25 the one or more of updated set of QoS values by at least
 26 communicating the updated set of QoS values to each of one or more edge
 27 differentiated services domain nodes, and
 28 the one or more edge differentiated services domain nodes using one or
 29 more of the updated set of QoS values to color the subsequent
 30 group;
 31 repeating the steps of estimating traffic bandwidth, determining an updated set of
 32 QoS values, and coloring a subsequent group multiple time, therein tuning
 33 the network on an ongoing basis.

- 1 26. (Previously Presented) The method as in claim 24, wherein the initial set of QoS
- 2 values is an initial set of Differentiated Services Codepoint (DSCP) values;
- 3 wherein the updated set of QoS values is an updated set of DSCP values;

wherein the step of estimating traffic bandwidth further comprises the steps of:

defining one or more QoS policies that specify target bandwidth values

and a range of possible services for each the plurality of data

flows, wherein a given target bandwidth value is specified for the

given data flow, and wherein the given target bandwidth identifies

a specific bandwidth that is desirous or required by the given data

flow;

gathering information about the traffic bandwidth; and

determining the traffic bandwidth based on the information gathered.

27. (Previously Presented) The method of claim 1, wherein the data flow is

associated with only one behavioral treatment at any given time.

28. (Previously Presented) The method of claim 24, wherein each data flow is

associated with only one behavioral treatment at any given time.

29. (Previously Presented) The method of claim 1, wherein the achieved flow

bandwidth is a percentage of the network bandwidth.

30. (Previously Presented) The method claim 29, wherein the second behavioral

treatment results in the dataflow having a different achieved flow bandwidth,

which is a different percentage of the network bandwidth.

31. (Previously Presented) The method of claim 1, wherein the determining of the

second behavioral treatment is in response to a determination of achieved flow

bandwidth resulting form the determining of the achieved flow bandwidth.

1 32. (Previously Presented) The computer-readable medium as in claim 5, wherein the
2 first behavioral treatment is determined without regard to the achieved flow
3 bandwidth.

1 33. (Previously Presented) The computer-readable medium as in claim 5, wherein the
2 second behavioral treatment is a behavioral treatment that provides a lower level
3 of service than other available choices of behavioral treatments; and
4 wherein the second behavioral treatment provides a high enough level of service
5 to accommodate the achieved flow bandwidth.

1 34. (Previously Presented) The computer-readable medium as in claim 5, wherein the
2 second behavioral treatment is a behavioral treatment that provides a minimum
3 level of service that is a sufficient level of service to accommodate the achieved
4 flow bandwidth.

1 35. (Previously Presented) The computer-readable medium as in claim 5, wherein the
2 step of marking the first group is performed by at least communicating the first
3 behavioral treatment to a differentiated services node located at a border of a
4 differentiated services domain; and
5 wherein the step of marking the second group is performed by at least
6 communicating the second behavioral treatment to the differentiated
7 services node.

1 36. (Previously Presented) A computer-readable medium as in claim 5, wherein the
2 method further comprises repeating the step of determining the achieved flow

bandwidth and steps that follow the step of determining the achieved flow
bandwidth.

37. (Previously Presented) A computer-readable medium as in claim 5, wherein the
method further comprises repeating the step of determining the achieved flow
bandwidth and steps that follow the step of determining the achieved flow
bandwidth multiple times, therein enhancing efficiency of the network on an on
going basis.

38. (Previously Presented) The computer-readable medium as in claim 5, wherein the
step of determining the achieved flow bandwidth is performed by at least
estimating the achieved flow bandwidth based on Management Information Base
(MIB) variables.

39. (Previously Presented) The computer-readable medium as in claim 5, wherein the
step of determining the achieved flow bandwidth is performed by at least
checking a Transfer Control Protocol/ Internet Protocol (TCP/IP) window size
and determining a value for the achieved flow bandwidth based on the TCP/IP
window size.

40. (Previously Presented) The computer-readable medium as in claim 5, wherein the
step of determining the achieved flow bandwidth is based on reception quality
feedback from a Real-Time Transport Protocol (RTP) receiver.

41. (Currently Amended) A computer-readable medium carrying one or more
sequences of instructions for marking one or more packets of data in a packet-

switched network based on achieved flow bandwidth information within the network, wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the method comprising:

receiving a first group of packets of a plurality of data flows from the network;

marking [[a]]the first group of packets of [[a]]said plurality of data flows with an initial set of behavioral treatment values, wherein the first set of behavioral treatment values direct devices within the network to treat the first group of packets with an initial set of quality of service treatments;

transmitting the first group of packets of said plurality of data flows in the network;

determining achieved flow bandwidths, wherein an achieved flow bandwidth is determined for each of the plurality of data flows based on data traffic within the network;

determining an updated set of behavioral treatment values based on the achieved flow bandwidths within the network; and

receiving a second group of packets of said plurality of data flows from the network;

after the steps of marking the first group and determining the updated set of behavioral treatment values, marking [[a]]the second group packets of said plurality of data flows with said updated set of behavioral treatment values, wherein the updated set of behavioral treatment values direct

25 devices within the network to treat the second group of packets with an
26 updated set of quality of service treatments; and
27 transmitting the second group of packets of said plurality of data flows in the
28 network.

1 42. (Previously Presented) A computer-readable medium carrying one or more
2 sequences of instructions for marking one or more packets of data in a packet-
3 switched network based on achieved flow bandwidth information within the
4 network, wherein execution of the one or more sequences of instructions by one
5 or more processors causes the one or more processors to perform the method
6 comprising:
7 defining an initial set of Quality of Service (QoS) values for coloring packets
8 within a plurality of data flows, wherein each of the QoS values indicates
9 an allocation of bandwidth;
10 coloring a first group of one or more packets of a given data flow selected from
11 the plurality of data flows, without regard to an achieved flow bandwidth,
12 by at least
13 communicating the initial set of QoS values to each of one or more edge
14 differentiated services domain nodes that are located at one or
15 more edges of a differentiated services domain, and
16 the one or more edge differentiated services domain nodes using one or
17 more of the initial set of QoS values to color the first group;
18 estimating traffic bandwidth within the network based on bandwidth information
19 corresponding to a current traffic pattern of the network, wherein the

20 traffic bandwidth estimated includes an achieved flow bandwidth for the
21 given data flow;
22 determining an updated set of QoS values for coloring packets within the plurality
23 of data flows, based on the traffic bandwidth estimated,
24 wherein the updated set of QoS values provide lower levels of service than
25 other available choices of QoS values, and
26 wherein the updated set of QoS values provide a high enough level of
27 service to accommodate the traffic bandwidth estimated;
28 coloring a subsequent group of one or more packets of the given data flow with
29 the one or more of updated set of QoS values by at least
30 communicating the updated set of QoS values to each of one or more edge
31 differentiated services domain nodes, and
32 the one or more edge differentiated services domain nodes using one or
33 more of the updated set of QoS values to color the subsequent
34 group;
35 repeating the steps of estimating traffic bandwidth, determining an updated set of
36 QoS values, and coloring a subsequent group multiple time, therein tuning
37 the network on an ongoing basis.

- 1 43. (Previously Presented) The computer-readable medium as in claim 41, wherein
2 the initial set of QoS values is an initial set of Differentiated Services Codepoint
3 (DSCP) values;
4 wherein the updated set of QoS values is an updated set of DSCP values;
5 wherein the step of estimating traffic bandwidth further comprises the steps of:

6 defining one or more QoS policies that specify target bandwidth values
7 and a range of possible services for each the plurality of data
8 flows, wherein a given target bandwidth value is specified for the
9 given data flow, and wherein the given target bandwidth identifies
10 a specific bandwidth that is desirous or required by the given data
11 flow;
12 gathering information about the traffic bandwidth; and
13 determining the traffic bandwidth based on the information gathered.

1 44. (Previously Presented) The computer-readable medium of claim 5, wherein the
2 data flow is associated with only one behavioral treatment at any given time.

1 45. (Previously Presented) The computer readable medium of claim 41, wherein each
2 data flow is associated with only one behavioral treatment at any given time.

1 46. (Currently Amended) The computer-readable medium of claim 5, wherein the
2 achieved flow bandwidth is a percentage of the network bandwidth.

1 47. (Previously Presented) The computer-readable medium claim 46, wherein the
2 second behavioral treatment results in the dataflow having a different achieved
3 flow bandwidth, which is a different percentage of the network bandwidth.

1 48. (Previously Presented) The computer-readable medium of claim 5, wherein the
2 determining of the second behavioral treatment is in response to a determination
3 of achieved flow bandwidth resulting form the determining of the achieved flow
4 bandwidth.

1 49. (Previously Presented) The computer apparatus as in claim 9, wherein the first
2 behavioral treatment is determined without regard to the achieved flow
3 bandwidth.

1 50. (Previously Presented) The computer apparatus as in claim 9, wherein the second
2 behavioral treatment is a behavioral treatment that provides a lower level of
3 service than other available choices of behavioral treatments; and
4 wherein the second behavioral treatment provides a high enough level of service
5 to accommodate the achieved flow bandwidth.

1 51. (Previously Presented) The computer apparatus as in claim 9, wherein the second
2 behavioral treatment is a behavioral treatment that provides a minimum level of
3 service that is a sufficient level of service to accommodate the achieved flow
4 bandwidth.

1 52. (Previously Presented) The computer apparatus as in claim 9, wherein the step of
2 marking the first group is performed by at least communicating the first
3 behavioral treatment to a differentiated services node located at a border of a
4 differentiated services domain; and
5 wherein the step of marking the second group is performed by at least
6 communicating the second behavioral treatment to the differentiated
7 services node.

1 53. (Previously Presented) A computer apparatus as in claim 9, wherein the method
2 further comprises repeating the step of determining the achieved flow bandwidth
3 and steps that follow the step of determining the achieved flow bandwidth.

1 54. (Previously Presented) A computer apparatus as in claim 9, wherein the method
2 further comprises repeating the step of determining the achieved flow bandwidth
3 and steps that follow the step of determining the achieved flow bandwidth
4 multiple times, therein enhancing efficiency of the network on an on going basis.

1 55. (Previously Presented) The computer apparatus as in claim 9, wherein the step of
2 determining the achieved flow bandwidth is performed by at least estimating the
3 achieved flow bandwidth based on Management Information Base (MIB)
4 variables.

1 56. (Previously Presented) The computer apparatus as in claim 9, wherein the step of
2 determining the achieved flow bandwidth is performed by at least checking a
3 Transfer Control Protocol/ Internet Protocol (TCP/IP) window size and
4 determining a value for the achieved flow bandwidth based on the TCP/IP
5 window size.

1 57. (Previously Presented) The computer apparatus as in claim 9, wherein the step of
2 determining the achieved flow bandwidth is based on reception quality feedback
3 from a Real-Time Transport Protocol (RTP) receiver.

1 58. (Currently Amended) A computer apparatus comprising:
2 a processor; and

3 a memory coupled to the processor, the memory containing one or more
4 sequences of instructions for marking one or more packets of data in a
5 packet-switched network based on achieved flow bandwidth information
6 within the network, wherein execution of the one or more sequences of
7 instructions by the processor causes the processor to perform the method
8 including at least:
9 receiving a first group of packets of a plurality of data flows from the network;
10 marking ~~[[a]]~~the first group of packets of ~~[[a]]~~said plurality of data flows with an
11 initial set of behavioral treatment values, wherein the first set of behavioral
12 treatment values direct devices within the network to treat the first group
13 of packets with an initial set of quality of service treatments;
14 transmitting the first group of packets of said plurality of data flows in the
15 network;
16 determining achieved flow bandwidths, wherein an achieved flow bandwidth is
17 determined for each of the plurality of data flows based on data traffic
18 within the network;
19 determining an updated set of behavioral treatment values based on the achieved
20 flow bandwidths within the network; ~~and~~
21 receiving a second group of packets of said plurality of data flows from the
22 network;
23 after the steps of marking the first group and determining the updated set of
24 behavioral treatment values, marking ~~[[a]]~~the second group packets of said
25 plurality of data flows with said updated set of behavioral treatment

values, wherein the updated set of behavioral treatment values direct devices within the network to treat the second group of packets with an updated set of quality of service treatments; and
transmitting the second group of packets of said plurality of data flows in the
network.

59. (Previously Presented) A computer apparatus comprising:

a processor; and

a memory coupled to the processor, the memory containing one or more

sequences of instructions for marking one or more packets of data in a

packet-switched network based on achieved flow bandwidth information

within the network, wherein execution of the one or more sequences of

instructions by the processor causes the processor to perform the method

including at least:

defining an initial set of Quality of Service (QoS) values for coloring packets

within a plurality of data flows, wherein each of the QoS values indicates

an allocation of bandwidth;

coloring a first group of one or more packets of a given data flow selected from

the plurality of data flows, without regard to an achieved flow bandwidth,

by at least

communicating the initial set of QoS values to each of one or more edge

differentiated services domain nodes that are located at one or more edges

of a differentiated services domain, and

18 the one or more edge differentiated services domain nodes using one or more of
19 the initial set of QoS values to color the first group;
20 estimating traffic bandwidth within the network based on bandwidth information
21 corresponding to a current traffic pattern of the network, wherein the
22 traffic bandwidth estimated includes an achieved flow bandwidth for the
23 given data flow;
24 determining an updated set of QoS values for coloring packets within the plurality
25 of data flows, based on the traffic bandwidth estimated,
26 wherein the updated set of QoS values provide lower levels of service than other
27 available choices of QoS values, and
28 wherein the updated set of QoS values provide a high enough level of service to
29 accommodate the traffic bandwidth estimated;
30 coloring a subsequent group of one or more packets of the given data flow with
31 the one or more of updated set of QoS values by at least
32 communicating the updated set of QoS values to each of one or more edge
33 differentiated services domain nodes, and
34 the one or more edge differentiated services domain nodes using one or more of
35 the updated set of QoS values to color the subsequent group;
36 repeating the steps of estimating traffic bandwidth, determining an updated set of
37 QoS values, and coloring a subsequent group multiple time, therein tuning
38 the network on an ongoing basis.

1 60. (Previously Presented) The computer apparatus as in claim 58, wherein the initial
2 set of QoS values is an initial set of Differentiated Services Codepoint (DSCP)
3 values;
4 wherein the updated set of QoS values is an updated set of DSCP values;
5 wherein the step of estimating traffic bandwidth further comprises the steps of:
6 defining one or more QoS policies that specify target bandwidth values
7 and a range of possible services for each the plurality of data
8 flows, wherein a given target bandwidth value is specified for the
9 given data flow, and wherein the given target bandwidth identifies
10 a specific bandwidth that is desirous or required by the given data
11 flow;
12 gathering information about the traffic bandwidth; and
13 determining the traffic bandwidth based on the information gathered.

1 61. (Previously Presented) The computer apparatus of claim 9, wherein the data flow
2 is associated with only one behavioral treatment at any given time.

1 62. (Previously Presented) The computer apparatus of claim 58, wherein each data
2 flow is associated with only one behavioral treatment at any given time.

1 63. (Currently Amended) The computer apparatus of claim 9, wherein the achieved
2 flow bandwidth is a percentage of the network bandwidth.

- 1 64. (Previously Presented) The computer apparatus claim 63, wherein the second
2 behavioral treatment results in the dataflow having a different achieved flow
3 bandwidth, which is a different percentage of the network bandwidth.
- 1 65. (Previously Presented) The computer apparatus of claim 9, wherein the
2 determining of the second behavioral treatment is in response to a determination
3 of achieved flow bandwidth resulting from the determining of the achieved flow
4 bandwidth.